

Sub A1

1. A semiconductor device, comprising:

5 a semiconductor chip;

 a dielectric layer;

 electrically conductive leads on said dielectric layer; and

 a low temperature curing adhesive material between said semiconductor chip and said dielectric layer.

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2. The semiconductor device of claim 1, wherein said dielectric layer includes polyimide.

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3. The semiconductor device of claim 1, wherein said dielectric layer includes benzocyclobutene.

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4. The semiconductor device of claim 1, further comprising bond wires connecting said semiconductor chip to said electrically conductive leads.

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5. The semiconductor device of claim 4, further comprising resin material encapsulating said bond wires.

Sub P2

6. The semiconductor device of claim 5, further comprising an opening defined in said dielectric layer, and wherein said bond wires and said resin material are located in said opening.

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7. The semiconductor device of claim 6, further comprising a ball grid array on said leads.

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Sub P3

8. A taped semiconductor product, comprising:
integrated circuits formed in semiconductor material;
a tape having openings aligned with said integrated circuits;
bond wires extending through said openings, said bond wires being
electrically connected to said integrated circuits; and
adhesive material between said tape and said integrated circuits.

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9. The taped semiconductor product of claim 8, wherein said tape includes a dielectric layer and electrically conductive leads, said leads being printed on said dielectric layer.

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Sub P4

10. The taped semiconductor product of claim 9, wherein said adhesive material cures at room temperature.

11. The taped semiconductor product of claim 10, further comprising
glob top encapsulant material in said openings.

5 12. The taped semiconductor product of claim 11, further comprising a
ball grid array for each of said integrated circuits, said ball grid arrays being
located on said electrically conductive leads.

10 *Sub 26* 13. A tape for manufacturing semiconductor devices, said tape
comprising:

15 a dielectric layer having openings,
electrically conductive leads associated with said openings, said leads
being printed on said dielectric layer; and
20 a low temperature curing adhesive material.

25 14. The tape of claim 13, wherein said dielectric material includes
polyimide.

15. The tape of claim 13, wherein said dielectric material includes
benzocyclobutene.

16. The tape of claim 13, wherein said dielectric material includes a metal alloy and a polymer coating.

5 17. The tape of claim 13, wherein said openings are slot-shaped to expose aligned bond pads.

10 18. The tape of claim 17, wherein said openings are punched through
said dielectric layer.

15 19. A method of making semiconductor devices, said method comprising
the steps of:

20 providing a semiconductor product having integrated circuits;
providing a tape having a dielectric layer and electrically conductive leads;
adhering said tape to said semiconductor product at low temperature; and
electrically connecting said integrated circuits to said electrically

conductive leads.

25 20. The method of claim 19, wherein the temperature of said tape does
not exceed one hundred fifty degrees Fahrenheit during said adhering step.

21. The method of claim 20, wherein said step of electrically connecting said integrated circuits to said leads includes the step of connecting bond wires to bond pads on said semiconductor product.

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22. The method of claim 21, further comprising the step of locating ball grid arrays on said electrically conductive leads.

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23. The method of claim 22, further comprising the step of encapsulating said bond wires in resin.

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24. The method of claim 23, further comprising the step of dicing said semiconductor product to separate said integrated circuits into individual semiconductor chips.

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25. A method of making taped products, said method comprising the steps of:

providing a sheet having electrically conductive leads and an epoxy adhesive layer;

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aligning said sheet with respect to integrated circuits; and
curing said adhesive layer at low temperature.

26. The method of claim 25, further comprising the step of connecting wires to said integrated circuits and said electrically conductive leads.

5 27. The method of claim 26, wherein the temperature of said adhesive layer does not exceed one hundred degrees Fahrenheit during said curing step.

10 28. The method of claim 27, further comprising the step of connecting ball grid arrays to said leads.

15 29. The method of claim 28, further comprising the step of flowing resin through a mask to glob top encapsulate said wires.

20 30. The method of claim 29, further comprising the step of separating said integrated circuits from each other to produce integrated circuit devices.

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Pb 31. A semiconductor device, comprising:

a semiconductor chip;

a dielectric layer;

25 electrically conductive leads on said dielectric layer; and

an anisotropically conductive adhesive material located between said dielectric layer and said semiconductor chip.

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32. The semiconductor device of claim 31, further comprising via holes defined in said dielectric layer, and metal located in said via holes, said metal being connected to said leads.

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33. The semiconductor device of claim 32, further comprising a ball grid array on said leads, said ball grid array being located within the periphery of said chip.

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